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SUMMARY

Bioinformatics Scientist with 4+ years of postdoctoral experience in research and analysis of genomics data. I am interested in developing computational approaches to glean actionable insights from large-scale multi-omics data. I am currently working on building machine learning models to guide biomarker discovery and assist in clinical decision making. I have extensive experience in written and oral communication to academics and business leaders through contributions to winning grants, 12+ peer reviewed publications, and several conference appearances.

EDUCATION

2017	**Ph.D. Computational Biology** (Cell and Molecular Biology) Dissertation: Transcriptome-based gene networks for systems-level analysis of gene function	**University of Arkansas,** Fayetteville, Arkansas, USA
2009	**M.S. Bioinformatics**	**Sardar Patel University**, India
2007	**B.S. Bioinformatics**	**Sardar Patel University,** India

RESEARCH EXPERIENCE

2021 – present **Postdoctoral Research Associate** — **University of Wisconsin**, Madison, Wisconsin, USA
- Single cell genomics of the human brain
- Cell type network biology
- Network-based drug discovery

2017 – 2020 **Postdoctoral Research Associate** — **University of Arkansas**, Fayetteville, Arkansas, USA
- Plant and crop genomics
- Gene prioritization protocols
- Web-applications for biologists

2012 – 2017 **Graduate Research Assistant** — **University of Arkansas**, Fayetteville, Arkansas, USA
- Plant stress and developmental biology
- Large-scale transcriptomics
- Gene regulatory networks

2008 — 2009 **Student Researcher** — **Disha Life Sciences Pvt. Ltd.**, Gujarat, India
- Fusion proteins in cancer
- Protein structure prediction
- Molecular modeling, drug designing

PUBLICATIONS

Under review/preprints

1. **Chirag Gupta**, Jielin Xu, Ting Jin, Saniya Khullar, Xiaoyu Liu, Sayali Alatkar, Feixiong Cheng, Daifeng Wang. Single-cell network biology characterizes cell type gene regulation for drug repurposing and phenotype prediction in Alzheimer's disease. (*preprint*)

2. **Chirag Gupta**, Arjun Krishnan, Andrew Schneider, Cynthia Denbow, Eva Collakova, Pawel Wolinski, Andy Pereira. SANe: The Seed Active Network for Discovering Transcriptional Regulatory Programs of Seed Development. (*preprint*)

Peer reviewed journal articles

1. **Chirag Gupta**, Pramod Chandrashekar, Chenfeng He, Ting Jin, Saniya Khullar, Qiang Chang, Daifeng Wang. Bringing machine learning to research on intellectual and developmental disabilities: taking inspiration from neurological diseases. in press, ***Journal of Neurodevelopmental Disorders*** (IDDRC 2022 special issue on computational neuroscience)

2. Anuj Kumar, **Chirag Gupta**, Julie Thomas, Andy Pereira. Genetic Dissection of Grain Yield Component Traits Under High Nighttime Temperature Stress in a Rice Diversity Panel. ***Frontiers in Plant Science**, September 2021. [full text]*

3. **Chirag Gupta**, Venkategowda Ramegowda, Supratim Basu, Andy Pereira. Using network-based machine learning to predict transcription factors involved in drought stress resistance. ***Frontiers in Genetics**, June 2021. [full text]*

4. Raksha Singh, Rohana Liyanage, **Chirag Gupta**, Jackson Lay Jr., Andy Pereira, Clemencia Rojas. The protein interactomes of AtNHR2A and AtNHR2B unraveled common and specialized functions in plant immunity integrating distinct biological processes. ***Frontiers in Plant Science**, March 2020. [full text]*

5. Min Woo Lee, Carmen S. Padilla, **Chirag Gupta**, Aravind Galla, Andy Pereira, Jiamei Li, Fiona L. Goggin. The FATTY ACID DESATURASE 2 family in tomato contributes to primary metabolism and stress responses. ***Plant Physiology**, Nov. 2019. [full text]*

6. **Chirag Gupta** and Andy Pereira. Recent advances in gene function prediction using context-specific coexpression networks in plants. ***F1000Research**, Feb. 2019. [full text]*

7. Arjun Krishnan, **Chirag Gupta**, Madana MR Ambavaram, Andy Pereira. RECoN: Rice Environment Co-expression Network for systems level analysis of abiotic-stress response. ***Frontiers in Plant Science**, Sep. 2017. [full text]*

8. Venkategowda Ramegowda, Upinder Singh Gill, Palaiyur Nanjappan Sivalingam, Aarti Gupta, **Chirag Gupta**, Geetha Govind, Karaba N Nataraja, Andy Pereira, Makarla Udayakumar, Kirankumar S Mysore, Muthappa Senthil-Kumar. GBF3 transcription factor imparts drought tolerance in Arabidopsis thaliana. ***Scientific Reports**, August 2017. [full text]*

9. Venkategowda Ramegowda, Supratim Basu, **Chirag Gupta**, Andy Pereira. Regulation of grain yield in rice under well-watered and drought stress conditions by GUDK. ***Plant Signaling and Behavior****, January 2015. [full text]*

CONFERENCE PRESENTATIONS

Talks

- Single-cell network biology characterizes cell type gene regulation for drug repurposing and phenotype prediction in Alzheimer's disease. **Alzheimer's Association International Conference,** San Diego, CA, 2nd August 2022
- Predicting rice genes important for drought tolerance using gene regulatory networks and machine learning. **Crops InSilico, 4th Annual Symposium and Hackathon**, Urbana, IL, 3rd May 2019
- Arabidopsis seed-filling association-network analysis. **American Society of Plant Biologists – Southern Section (ASPB-SS)**, Lexington, KY, 30th March 2014.

Select posters

- Single-cell network biology characterizes cell type gene regulation for drug repurposing and phenotype prediction in Alzheimer's disease, **Intelligent Systems for Molecular Biology**, Madison, WI, July 2022
- Network analysis of human brain cell types under Alzheimer's disease and healthy conditions, **Society of Neuroscience**, Chicago, IL, November 2021
- Network-based approach to prioritize lung cancer genes from whole-exome sequencing data. **Arkansas Bioinformatics Consortium**, Little Rock, AR, 25th March 2018
- [*Award winning poster*] An abiotic-stress conditioned gene regulatory network in rice predicted using an ensemble of reverse-engineering solutions. **The 25th Plant and Animal Genome (PAG) Conference**, San Diego, CA, 14th January 2017
- A resource for systems analysis of stress response in rice. **NSF Workshop on plant development and drought stress**, Monterey, CA, 8th November 2015
- In Silico Analysis of Fusion Proteins in Cancer, **International Conference on Biomedical and Genomic Research**, Ahmedabad, India, 30th January 2009

AWARDS

1. Crops in silico underrepresented minority travel scholarship, **Crops InSilico**, Urbana, IL, 2019
2. Scherago International Student Travel Grants Awards, **The 25th annual Plant and Animal Genome (PAG) meeting**, San Diego, CA, 2017
3. NSF Travel Grant to attend the Workshop on Plant Development and Drought Stress, **National Science Foundation**, 2015
4. Stood 3rd in merit list for all India entrance examination for Master's in bioinformatics program, **Sardar Patel University**, India, 2007
5. 2nd Prize in undergraduate oral presentation, **Sardar Patel University**, India, 2006
6. 3rd Prize in undergraduate poster competition, **Atmiya University**, India , 2006

GRANT CONTRIBUTIONS

- **NSF EPSCoR RII Track-2 FEC 1826836**: Systems genetics studies on rice genomes for analysis of grain yield and quality under heat stress (PI: Dr. Andy Pereira; $4,659,406), 2018

- **NSF MCB 1716844**: Systems genetics analysis of photosynthetic carbon metabolism in rice (PI: Dr. Andy Pereira; $798,725.00), 2017

SOCIETY MEMBERSHIPS

2019 - present **The International Society for Computational Biology (ISCB)**

SELECT SKILLS

Programming	R, Python, Perl, PHP, mySQL
Bioinformatics	Raw sequence data (NGS) processing, quality control, and downstream analysis (single-cell, bulk); differential expression, variant calling, gene-set enrichment analysis, network analysis
Data science	Machine learning (data cleaning, feature extraction, model training and evaluation); Supervised and unsupervised learning.
Visualization	R, Shiny, Cytoscape
Platforms	Docker; Linux, MacOS; Google Cloud

TOOLS DEVELOPED

GRAiN	http://rrn.uark.edu/shiny/apps/GRAiN/
SANe	https://plantstress-pereira.uark.edu/SANe/
RECoN	https://plantstress-pereira.uark.edu/RECoN/

MENTORING EXEPRIENCE

Mentored a graduate student (Masters in Statistics, UW) and four undergraduate students under the University of Madison's Undergraduate Research Scholar contract for two semesters, 2021-2022. Project title: "Using network-based machine Learning to predict genes underlying neurological disorders"

TEACHING EXPERIENCE

Co-taught Plant Genomics (**Bioinformatics/Genomics modules**: CSES 5543, Uni. Of Arkansas), 2016, 2018

EXTENSION ACTIVITIES

Student and Teacher Workshop: rice genetic variation (18 credit hours, Uni. Of Arkansas), 2019

ACADEMIC SERVICE

- **Manuscript reviewer** for Human Molecular Genetics, Journal of Neurodevelopmental Disorders, Plant Physiology, Frontiers in Plant Science, Nature Scientific Reports, Rice, Plant Cell Reports, Horticultural Plant Journal, Plant Methods, PLoS One, iMETA.
- **Plante Fellow 2019**: Contribution to the Plantae online portal for Bioinformatics resources relevant to plant biology research
- **Member of the panel of judges** for the Northwest Arkansas Regional Science and Engineering Fair 2015,16

- Conducted several training material and hands-on activities for undergraduates and K-12 students from the Arkansas agricultural areas in the Delta region for a **STEM literacy outreach program**

REFREES

Available upon request